Clouds and the Earth's Radiant Energy System (CERES) Monthly TOA/Surface Averages (SRBAVG) Data Set Abstract

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Data Set Description:

The SRBAVG product contains monthly and monthly hourly regional, zonal, and global averages of the TOA and surface LW and SW fluxes and the observed cloud conditions for each 1-degree equal-angle region. There are two types of regional TOA fluxes. They are CERES only and the combined CERES and GEO fluxes. The surface fluxes have been calculated from the TOA fluxes using parameterizations provided by the science team, instead of using the models provided by the SARB Subsystem. No flux fields are calculated at levels between TOA and the surface.

SRBAVG is an archival product produced by Subsystem 10. There is one produced for each spacecraft and one for each combination of spacecraft. This product is written in HDF and contains metadata as well as gridded science data. The science data are SDSs with multiple records. Each record contains spatially averaged data for an individual region, zone and globe.

On a Regional, Zonal, and Global Basis, the SRBAVG product includes:

SRBAVG1	• Regional parameters • Surface data • Total-sky radiative fluxes at TOA and surface • Clear-sky radiative fluxes at TOA and surface
SRBAVG2	• CERES and GEO Layer-averaged cloud properties
SRBAVG3	• CERES Layer-averaged cloud properties

Each cloud product includes:

- Cloud Layer - High (mean, standard deviation, number of observations)
- Cloud Layer - Upper Mid (mean, standard deviation, number of observations)
- Cloud Layer - Lower Mid (mean, standard deviation, number of observations)
- Cloud Layer - Low (mean, standard deviation, number of observations)

Additional information about the format and content of the SRBAVGs can be found in the CERES Data Products Catalog. A detailed description of the SRBAVG will be found in the SRBAVG Collection Guide.

Summary of Changes:

The CERES Data Management Team and the Atmospheric Sciences Data Center (ASDC) at Langley use a Sampling Strategy, a Production Strategy, and a Configuration Code (CCode) to track versions of CERES primary data products. In general, minor reprocessing changes are tracked by increasing the Configuration Code while major reprocessing changes result in a new Production Strategy. The Sampling Strategy identifies the satellite and instruments which acquired the data in the product

A summary of changes made to the CERES SRBAVG product is shown in the following tables.

Modification History for: Aqua | Terra | TRMM

Table 1: Modification History of the CERES Aqua SRBAVG Product

Sampling Strategy and Production Strategy	CCode	Available at ASDC	Impact on Aqua SRBAVG Product
Aqua-FM3-MODIS-Edition2A (4) Aqua-FM4-MODIS-Edition2A (4)	016031	March 2008	• Eliminate the restrictions of the view zenith and the azimuth angles for the RAPS mode data
Availability: (1) not available; (2) restricted to CERES analysts; (3) restricted to CERES Science Team and analysts; (4) public			

Modification History for: Aqua | Terra | TRMM

Table 1: Modification History of the CERES Terra SRBAVG Product

Sampling Strategy and Production Strategy	CCode	Available at ASDC	Impact on Terra SRBAVG Product
Terra-FM1-MODIS-Edition2D (4) Terra-FM2-MODIS-Edition2D (4)	016028 and 015026	May 2006	• Eliminate the restrictions of the view zenith and the azimuth angles for the RAPS mode data.
Terra-FM1-MODIS-Edition2C (4) Terra-FM2-MODIS-Edition2C (4)	013023	June 2005	• The cloud linear optical depth is replaced with the cloud log optical depth. • The coding error in the halfsine fit for the clear-sky LW TOA fluxes is modified. • In the regional average of the TOA fluxes, snow ice regions were considered to be land and the identification of the snow ice and land regions was modified to avoid the halfsine fit for the snow ice regions. • The SW surface flux data and the GEO SW fluxes are defaults. • The zonal linear interpolation for the clear-sky non-GEO and GEO LW fluxes is included. • The sampling restriction threshold is added to check for partially filled regions. • Night time cloud retrieval is included. • ADM code and ADM data files are updated. • IGBP map is updated. • The check for sun glint in GEO data is added to eliminate GEO cloud properties when sun glint is present. • The HDF file compression is included to reduce the file size.

Availability: (1) not available; (2) restricted to CERES analysts; (3) restricted to CERES Science Team and analysts; (4) public

Modification History for: Aqua | Terra | TRMM

Table 2: Modification History of the CERES TRMM SRBAVG Product

Sampling Strategy and Production Strategy	CCode	Available at ASDC	Impact on TRMM SRBAVG Product
TRMM-PFM-VIRS_Edition2B [(4)]	010018	January 2003	• The monthly-hourly TOA net fluxes calculation was modified. • The zonal and global TOA net fluxes were changed to use the zonal and global LW and SW fluxes in the calculation. • The averaged monthly-hourly TOA clear-sky LW fluxes were not agreed with the monthly mean. This error was corrected. • The monthly mean surface fluxes were updated. • The name "Total Cloud Area Fraction" is changed to "Cloud Area Fraction" in SRBAVG2 and SRBAVG3.
Availability: (1) not available; (2) restricted to CERES analysts; (3) restricted to CERES Science Team and analysts; (4) public			

References:

An overview of the temporal interpolation and spatial averaging algorithms used for CERES can be found in the following reference:

Young, D. F., P. Minnis. D. R. Doelling, G. G. Gibson, and T. Wong, 1998: Temporal Interpolation Methods for the Clouds and Earth's Radiant Energy System (CERES) Experiment. *J. Appl. Meteorol.*, **37**, 572-590.

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Acknowledgement:

The requested form of acknowledgment for any publication in which these data are used is:

"These data were obtained from the NASA Langley Research Center Atmospheric Science Data Center."

The Langley Data Center requests a reprint of any published papers or reports or a brief description of other uses (e.g., posters, oral presentations, etc.) of data that we have distributed. This will help the Data Center determine the use of data distributed, which is helpful in optimizing product development. It also helps us to keep our product related references current.

Reference:

The CERES Team has gone to considerable trouble to remove major errors and to verify the quality and accuracy of these data. Please provide a reference to the following paper when you publish scientific results with the CERES data:

Wielicki, B. A., B. R. Barkstrom, E. F. Harrison, R. B. Lee III, G. L. Smith, and J. E. Cooper, "Clouds and the Earth's Radiant Energy System (CERES): An Earth Observing System Experiment," *Bull. Amer. Meteor. Soc.*, **77**, 853-868, 1996.

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